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USEFUL RECEIPTS.

New Lubricating Materials.

Take some resin oil, and after having allowed it to settle for a short time, boil it in a copper kettle with a hundredth part of its weight of slacked lime, it is then to be poured out quite hot into vessels, when a separation of all extraneous matters takes place. Eight gallons of this oil are heated in a cast-iron boiler, to which are added fifty-five pounds of slacked lime that have been passed through a very fine wire, and to be stirred up the whole time of pouring it into the vessel. Oil and lime are added in the above proportions until the boiler is full. This is heated until the water of the lime has evaporated, which can be known from the appearance of the substance resembling that of liquid chocolate. When this is done, five gallons of resin oil and about four lbs., of this lime paste are poured into a copper basin with handles. The mixture is well shaken and poured off into vessels. By this means a good composition for oiling machinery is obtained. In an additional patent the inventor adds a little tar oil (naphtha), particularly when it is required to oil large machines.

Another receipt of the same inventor consists in adding 2½ gallons of oil to 1¼ lbs. of some oleaginous substance. Shake this up and add the same quantity of slacked lime, previously boiled with oil which has been made anhydrous. The mixture is well shaken and kept in vessels for use.

Artificial Flowers.

Me. Girardin, of Brussels, Europe, has patented a new manner of making gold and silver embroideries as well as artificial flowers, which she thus explains:—After having taken the drawing, it is punctured and rubbed over a piece of parchment covered with ink, and the outlines are traced with black lead; you then take a piece of gold wire formed with three twists, and follow with it the outlines of the drawing, fastening it down with linen thread. When all the outlines have been followed, another piece of wire, twisted in like manner and of the finest kind to be obtained, is passed through the eye of a needle, which is prepared so as not to cut the wire. The parts of the drawing to be copied are then followed by the needle, and attention must be paid to knot the beginning and end of each needleful, as well as when the wire happens to break. When the drawing has been followed all over the piece of parchment, it is turned back to cut the threads that held the wire forming the outlines. The work is then taken off and cleared of the shreds of thread by means of a small pair of pincers. For flowers the petals are then arranged one over another, and fastened with a wire of the same metal; a metal wire stronger than this last is placed in the calyx, and twisted to form the end. The work is then washed with soap and dried perfectly in box-wood saw-dust. It is afterwards taken out of the saw-dust, and the flower finished by fashioning it as required.

GWYNNE'S CENTRIFUGAL PUMP.

Figure 1.

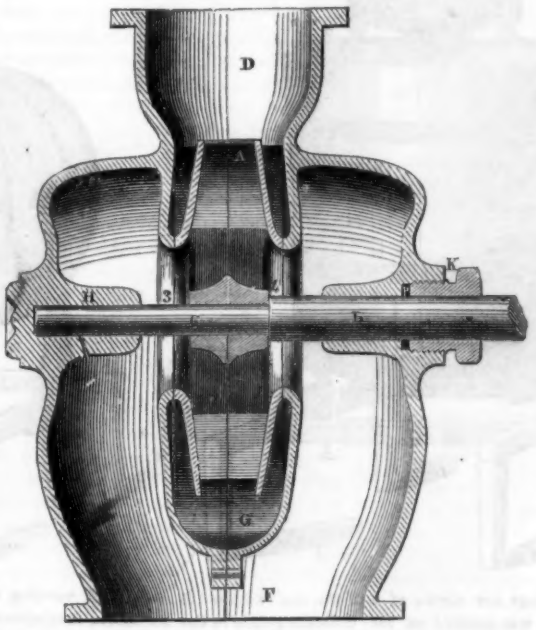
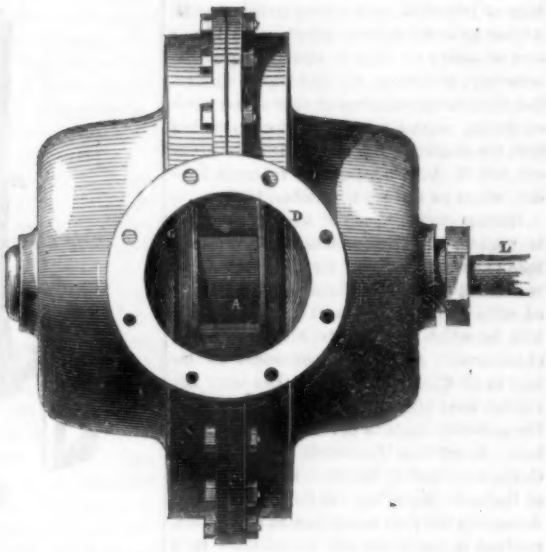


Figure 2.



The annexed engravings are views of "Gwynne's Centrifugal Balance Pump," patented last year. Figure 1 is a vertical transverse section. Figure 2 is an outside view of figure 1, showing the discharge-pipe, D.—Figure 3 is an inside view showing one disc with its radial arms. Figure 4 is an edge view of the two discs or rotary pistons which constitute the pump when placed inside of the fixed case, figure 2. The same letters refer to like parts.

The nature of a centrifugal pump consists in receiving water by an orifice or opening at the centre and discharging it at the periphery. It has no sliding pistons or rings like most rotary pumps, but simply consists in having two discs united together by an arm or arms, and placing these on a shaft in an air tight case, connected with a central suction orifice, and a circumferential discharge pipe. A, figure 4, is the rotary piston formed of the two discs, which are constructed with radial arms as shown in figure 3, and which constitute the water passages, through which the water flows from the central inlet openings in radial lines to the circumference where it is discharged at tangents into the pipe, D. The rotary piston is secured on the shaft, C; 3 and 4 are central openings into the inside of the two discs, which are formed like two saucers united with their concave surfaces placed towards one another; K is a stuffing box, and P is the packing; L is the driving shaft, on which a pulley is secured to drive the rotary piston by a belt; G is the chamber in which the water is gathered previous to its discharge, and F is the base of the case for the pump to be secured to any proper bed, and at the same time it is the suction pipe which leads down into the cistern or whatever it may be. The water therefore enters up through the bottom of the outside case and passes into the inner case by the central openings, 3 and 4, and into the interior of the rotary piston—the two united discs—and is driven out of the pipe, D; H is a bearing for the journal of shaft, C. The engravings exhibit what is termed a drainage pump, one built for the discharge of large volumes of water to distances of from 5 to 20 feet. For great elevations, and for fire-engines, a smaller suction and discharge pipe, and smaller issues in the rotary piston are employed.

Fig. 3.

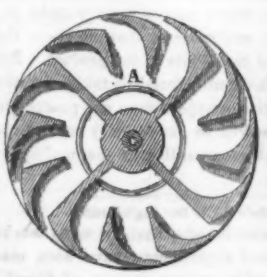
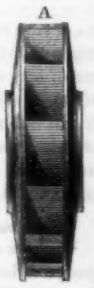


Fig. 4.



It will be observed that the construction of this pump is simplicity itself, and there is no part about it liable to wear out—no packing and repacking required. It is especially adapted to the pumping of saccharine matters in sugar houses; to the drainage of marshes, such as rice fields, &c., and for coffer dams, and such like purposes. It operates by centrifugal action, the water being drawn in at the centre suction openings, and discharged tangentially at the circumference. We have been informed that it has given out 85 per cent. of the applied power, and nearly that amount may be relied upon. Common plunger pumps do not average 50 per cent., one in the best order will give out 70 per cent. It was on exhibition at the last Fair of the American Institute, and discharged a quantity of water according to its size, which surprised all who witnessed its operations. A rotary piston, when so constructed as to require no packing, and not rubbing continually with its periphery on a stationary surface, which would soon wear it untrue, possesses numerous advantages; its operation is uniform and continuous; its price is one-third less than other pumps, and it is very durable. Different sizes of this kind of pump are manufactured at the works of the Union Power Co., No. 353 West 24th street, this city, Joseph E. Holmes, general agent, also agent of Dick's Press, business office, 49 Dey street.

The inventor of this pump offered to test it for one whole year for $5,000, with any one at the Great Exhibition. This offer was not taken up by the inventor of any pump there. One of these pumps, twelve inches in diameter, has been running at the extensive paper mills of Owen & Hurlbut, South Lee, Mass., for one year, day and night, constantly, and has not yet cost one cent for repairs; this is the best of testimony to its durability. This company, in a certificate, assert that it requires less power to operate this pump than any they have ever used. As such pumps are constructed for one-third less than others, the economy in price is a most important consideration. Every person wants a cheap and good article—these two conditions are not always united. In the large pumps gravel will pass freely through, and stones of 1½ inches diameter will flow in and out without any injury.

The Submarine Explorer.

In number 11, of last volume, Scientific American, we illustrated and described the apparatus of M. Alexandre, for submarine diving and exploration, and without any doubt we consider it an ingenious apparatus. Since that time we have heard little about it, excepting some experiments made at the Brooklyn Navy Yard and at the Battery during the last Fair of the American Institute. In France, where it was invented, it is more highly esteemed. In the harbor of Cherbourg, which is occupied with docks and arsenals, one of these machines, 40 feet long, is employed daily to remove some submarine rocks which obstruct the entrance to one of the basins. It is of a large capacity, for nine men can go down in it and work for eight hours under water, with the supply of air which they take down with them. There is no need of tubes and force pumps to supply pure air from above. In the description which we published on the page referred to, it is stated that lime water is employed to purify the atmosphere in the Explorer when it becomes impure by the carbonic acid gas expelled from the lungs of the operators. It has been found by experiment that when the apparatus is working in a current, there is not the least occasion for the lime water. The carbonic acid is heavier than the common atmosphere, and also combines more readily with water, therefore it drops down into the current, in which the men work, at the bottom of the machine, and is carried off; this is an important scientific fact well worth treasuring up, as it proves to us that a vessel of water placed upon a stove answers more than one beneficial purpose, viz., to send moisture through the atmosphere; it also absorbs impurities which may be in it. Running streams in cities and villages, upon the same principle, tend to promote health by absorbing impurities from the atmosphere, as well as carrying them off by mechanical contact.

MISCELLANEOUS.

Flax Cotton.

M. Hamel lately delivered an address before the Imperial Academy of Russia, on the subject of Flax Cotton, in which he gives a different account of its invention to what is generally supposed. According to him, a native of Holstein, named Ahnesorge, by trade a dyer and bleacher, had applied himself for several years to improving flax spinning, as well as to turn to account the tow, which is of little value. For this purpose he made several journeys, and in 1838 went to St. Petersburgh with a sample of about a dozen pounds of a cottony material from flax tow. In 1846 the king of Denmark, having been informed of M. Ahnesorge's industrious efforts, sent him a sum of money to help in establishing a manufactory, but just as he had begun, at Neumeistler, the manufacture of cotton and woolen fabrics, mixed with his cotton from flax tow, the disastrous war of the Duchies broke out, and M. Ahnesorge sought refuge in London, where he arrived in October, 1848.

Having applied to one of the principal patent agents for advice, on what steps he should take to procure a patent for his invention, he was introduced to M. Claussen, who, delighted with his project, made an agreement with him, by which he was to take out the patent in his name. Ahnesorge commenced his labors in M. Claussen's house, in London. His articles were highly spoken of, but he wanted the necessary funds to develope the manufacture. A native of Hamburgh, named Auguste Quitzow, settled at Bradford, under the name of Quitzow, Schlesinger & Co., and to whom Ahnesorge had been recommended in Holstein, resolved to carry on the manufacture in a large way Yorkshire. He bought a place at Apperley Bridge, between Bradford and Leeds, and with the consent of Claussen, engaged Ahnesorge to prepare the flax, and make the cotton according to his method. M. Hamel says that all the samples, both white and dyed, exhibited at the Crystal Palace in the name of Claussen, as well as in that of Quitlow, Schelennger & Co., were made at Apperley Bridge by M. Ahnesorge; the public were not informed of this circumstance. The attempts to card and spin Ahnesorge's products were made near Rochdale, in a factory that Mr. Bright, the well-known politician had placed at the disposal of M. Claussen, who had, in fact, taken out the patent in his own name. The high price of cotton, at the time of the Great Exhibition, had led to the hope that a project for substituting flax would easily find purchasers, and this was the reason why M. Claussen, described, in this patent, a process for cutting the cotton flax into small pieces, of the same length as the cotton rovings, so as to be able to card and spin them on the machines constructed for cotton. Besides, he wishes it to be supposed that, by placing this flax thus cut up, after it has been boiled in a solution of bi-carbonate of soda, into sulphuric acid diluted with water, it will split, from developing carbonic gas, in appearance resembling cotton. M. Claussen has started a company with a capital of £250,000 to £500,000, to carry on the manufacture, and he exerts every possible effort to obtain purchasers for his patent. To exhibit his patented process of splitting the flax, he has rented a place at London, where M. Ahnesorge (who is never named) has first to prepare the flax or tow by boiling it in a solution of soda, and where, afterwards, the experiment of chemical effervescence is made before visitors. This is called the splitting process.

M. Hamel declares it to be impossible to change the flax into a fibrous matter resembling cotton, which is the work of nature. He is decidedly opposed to the project of cutting up the dressed flax into a sort of tow. The superiority of flax over cotton consists, in a great measure, in the greater length of its fibres. The result, therefore, would be to convert a primary valuable material into a very inferior one.

With the aid of Lord Rosse's great telescope, every object on the moon's surface, of the height of one hundred feet, may be distinctly seen. Craters of extinct volcanoes, rocks and masses of stone, are almost innumerable. But there are no signs of habitations such as ours, no vestige of architectural remains, to show that the moon is or ever was inhabited by a race of mortals similar to ourselves. No water is visible, no sea, no river; all seems desolate.

Slating the Track.

The track of the railroad has been slated for several miles from Camden, N.J., for the purpose of preventing the rising of dust when the cars pass. Workmen are still employed extending the work.

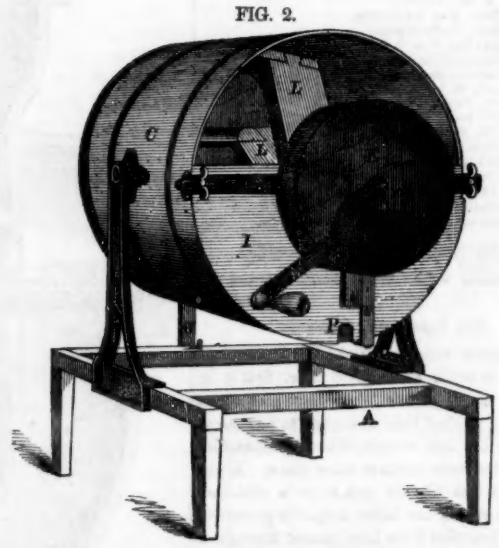
No Coal on Lake Superior.

Charles Whittlesey, an eminent geologist, asserts, in a communication to the Lake Superior Journal, that from the geological formation of their rocks, there is not, and cannot be coal found on Lake Superior.

PATENT CHURN AND BUTTER WORKER.

FIG. 1.

FIG. 2.



The annexed engravings are views of a churn for which a patent was granted on the 5th of October (1852) to Brown and Bigelow, in the name of Henry K. W. Welch, assignee.

Figure 1 represents the churn and butter worker with the tub in an upright position for churning the cream.

A is a frame work of any desirable material; B B are two standards or supporters bolted or screwed firmly to the frame, A; C is a tub, slightly conical in shape, containing the fans or beaters, and so hung to the tops of the standards, B B, that it may be easily swung into the position represented in figure 2; D D is a diametrical bar, across the open end of the tub and supporting the fans or beaters and the gear; E is a box with inside gear resting upon the bar D D; F is a crank; G is a bale or fork which secures the tub in the different positions represented above, by means of pins in the frame work; H is a pin to which is attached the slide securing the covers.

Figure 2 represents the churn and butter worker with the tub in a horizontal position for working the butter.

A B C D E F and G, same as in figure 1; K is a slide passing under the cross bar, D D, and securing the covers; I is one part of the cover—the other part being similar to it with the exception of the aperture; L L are the fans or beaters revolving in opposite directions, one within the other, and meeting at different points in the successive revolutions; P is a small aperture for the escape of the butter-milk and watery substances after bringing the tub into a horizontal position and while working the butter; at each end of the cross bar, D D, is a thumb-screw, by means of which the bar is firmly secured to each side of the tub. These screws can be instantly removed and the bar with the fans and gearing attached taken out—leaving the tub entirely open with nothing to obstruct or hinder in taking out the butter and cleaning the tub.

It is obvious that the fans or beaters, from their configuration and from their revolving in opposite directions, must agitate the cream and bring every portion of it into contact with the atmospheric air, more effectually than can be done by any other process. Consequently the operation of churning is rendered much shorter and easier.

The churning is so thoroughly done that every particle of butter is extracted and not a drop of the cream is lost.

After the butter has come, place any convenient receptacle under the frame, and having removed the upper part of the cover, gently swing the tub into the position represented in figure 2—in which position all the butter-milk and liquid substances will drain off through the aperture, P. By this arrangement there is a great saving of trouble and labor in lifting and pouring off the butter-milk.

After draining off the butter-milk, swing the tub back to its upright position, sprinkle in the requisite amount of salt, and having replaced the upper part of the cover, again secure the tub in a horizontal position. Then turn the crank as in churning, and in three minutes' time the whole mass of butter will be more thoroughly and beautifully kneaded, rolled and worked, than can possibly be done by hand in any length of time—and the salt will be thoroughly and equally diffused through the entire mass.

By the aid of this churn and butter worker, a single woman can easily do all the churning and butter making of a very large dairy, and that too without touching the butter with her hands. A few minutes after putting the cream into the churn, you can take out the butter all ready for the table or the market—without a particle of butter-milk or other liquid substance in it, compact and firm, and not liable to become rancid.

This churn and butter worker took the first premium at the late annual Hartford County Fair.

State, county, and town rights for sale, address A. H. Welch, Hartford, Conn., agent for assignee, to whom communications should be addressed for information about such matters.

Singular Properties of the Digit 9.

The figure 9, multiplied by itself, or by one of the other digits, always gives a number whose two digits, when added together, give 9 for the sum. The digits composing the sum of the series of nine digits (that is 45), added together, give 9. The sum of all the products of 9, multiplied by the series of digits (that is, 405) and divided by 9, gives for a quotient 45, and the digits forming the dividend or quotient, added together give 9. If a row of any digits be multiplied, either by 9 or by any one of the products of 9 multiplied by one of the digits of the series, such as by 18, 27, 36, 45, 54, 63, 72, or 81, the sum of the digits of the product will be divisible by 9. If these nine digits of the series are multiplied in the following order: 1, 2, 3, 4, 5, 6, 7, 8, 9 by 9, or one of the other products mentioned above, the product obtained will contain only similar digits except at the tens, where there will be a 0; that is to say, if the series is multiplied by 9, there will be all ones, if by 18, all twos, if by 27, all threes, and so on, except at the tens, where there will be always 0; this 0, coming always under the digit of the multiplicand that destroys the uniformity of the digits of the product. But if the 8 in the multiplicand is taken out, the 0 will likewise disappear from the product, in which there will be found only ones, twos and threes, &c., according to the multiplier made use of.

Grant's Light for Lighthouses.

We have seen it stated that, for many weeks past, a series of experiments have been making, resulting in perfect success, of Grant's system of lighthouses, and a report in its favor is to be made to the next Congress by the naval officers by whom the experiments have been condncted. The plan is to make use of the Drummond light—the strongest artificial light known—which can be seen distinctly for many miles through a thick fog. The cost of the machinery will be about $1,000, whereas a "Fresnel" light costs $16,000. But the question arises, "can it be maintained as cheaply?" We believe it cannot, and will await patiently for the next Report of the Lighthouse Board for positive information.

Patent Cases.

On the 26th ult., in the U. S. Circuit Court, this city, for a Bell Telegraph—E. Crehore, et al., against H. Johnson, for infringment of "Jackson's Patent." A verdict was rendered for the plaintiff with 6 cents cost; the point of infringment was a spring for setting the machine before using. Mr. Russell, we believe, is the oldest inventor of Bell Telegraphs in this city. His first patent expired some years ago.

TURNING.—Plaintiff, W. Hale; defendant, A. E. Brooks.—This was an action brought against defendant for an infringement of a patent to W. Hale and Allen Goodman, of Dana, Mass., in July, 1845. for making pianoforte legs. The jury gave a verdict of $2,355,77—for the use of one machine—a pretty heavy verdict. In both cases these patents were sustained. Judge Betts was on the bench, and gave very able charges.

The shock of an earthquake was felt between 4 and 5 o'clock A. M., on Tuesday, Nov. 9, throughout England and Ireland. No damage done.

Machinery and Tools as they are.—The Steam Engine.

(Continued from page 83.)

DIRECT-ACTION ENGINES—This class of engines derives its appellation from the manner in which the motion of the piston is transmitted to the crank, which is placed directly over the cylinder and connected to the piston rod either by the agency of a connecting-rod or even, in some instances, the latter is dispensed with, and the piston-rod itself connected to the crank pin. Attempts are frequently made to classify direct-action engines into three or four varieties; some arranging them according as they are made with a parallel motion, or from using, instead, a guide motion, but these small minutiæ are features not sufficiently distinctive to constitute different varieties. Other modes of classification are equally objectionable, for the truth is, when this form of machinery became popular, almost every maker had some peculiar arrangement or modification of his own. From this circumstance there has arisen an endless variety of direct-action engines, many of which have already fallen into oblivion, leaving only the better sorts still in use. We shall therefore briefly sketch the outlines of a few that stand conspicuous, but before doing so, will make a few remarks on the benefits and disadvantages which result from this substitution for the beam or side-lever engine. We have stated whence they derived their name, but the position of the crank directly over the cylinder, is itself a great evil, compelling the constructor, in the most simple forms of this class, to a choice of two evils—either to have a short stroke and short connecting-rod, or to place the paddle shaft excessively high, to which evils there must be added great friction and consequent wear. Their chief recommendations are, that they allow the length of the engine-room to be diminished by one-third, and the weight of the machinery to be at least two-fifths less than heretofore. There is an important difference between the naval and mercantile marine, which should not be lost sight of; in vessels of war it is of the first importance to keep as much of the machinery as possible beneath the water-line, so as to be secure from injury during an engagement, hence a good engine might be rejected for the government service, although well adapted for a merchant vessel, and on the contrary an engine adapted for the navy might not be advisable for the latter purpose. The engine of this kind which ranks first in estimation at present, and not without reason, is the Oscillating Engine. On this account, and because there are several peculiarities about it, we shall describe this sort of engine rather more fully; it must, however, be premised that the oscillating principle has lately been applied to machinery differing much in form, but in the following we shall more particularly refer to the engine most generally used. Its peculiar feature, and from which it derives the name, is, the swaying or rather oscillation of the cylinder:—the piston-rod is provided with a head and strap, so as to connect directly with the crank-pin, without the intervention of a connecting-rod, but it is evident that, as the piston moves up and down in a straight line, an arrangement is necessary to allow of the rotary movement of the crank, this is effected by the cylinder having two gudgeons or trunnions on it, midway between the top and bottom, so that when placed in bearings it can oscillate freely, and will yield to the motion of the crank as the latter is impelled by the piston-rod. The bed-plate is formed with plummer-blocks for the reception of the cylinder gudgeons, and there are firmly attached to it eight wrought-iron columns, which support the top frame or entablature, this latter having on it the main plummer blocks in which the shaft revolves. We have mentioned that the cylinder moves to-and-fro on its central bearings, but here a difficulty occurs,—how to supply it with steam; this is accomplished by making the gudgeons or trunnions hollow, one being for the reception of the steam, and the other to convey the exhaust steam to the condenser. The communication between the slide-valve casing and these hollow gudgeons, is by two passages that are carried around the cylinder, and form part of the same casting. The slide casing oscillates with the cylinder, and the manner in which the valve is worked is also peculiar, for it is evident that the distance between the eccentric and the weigh-shaft which moves the valve is continually changing. This is arranged by means of a frame, which moves up and down when the notch in the eccentric rod is made to grasp a stud in the centre of the above frame. There is a curved slot in the lower part of the frame, in which moves a roller giving motion to the weigh-shaft, so that as the frame moves up and down the slide-valve partakes of the motion, and when it is requisite to reverse the engine, the operation is effected by moving the frame with a lever suitably attached. Between the two cylinders are placed the condensers, air and feed pumps, &c.; frequently only one condenser and air-pump are used for the two cylinders, which arrangement is liable to the objection that if the air-pump gets out of order the whole machinery is disabled. An intermediate crank shaft is employed to work the pumps.

Some modifications have lately been introduced, affecting chiefly the condensing apparatus, the mode of admitting the steam, and the use of two light separate slide valves instead of the heavy single valve casing, so as to improve the balance of the cylinders. Oscillating cylinders have also been applied to that kind of framing which is formed with two inclined planes, on which the cylinders are placed so that they incline to each other and as regards the vessel are fore-and-aft to it, or in other words, stand in a line with the keel, a position which causes less strain on the vessel. With this arrangement only two cranks are required, which can be connected by a drag-link, and there is a considerable diminution of weight and friction,—the same framing is also often used for fixed cylinders.

The Trunk Engine is another variety which after being neglected for some time, has lately been placed in several large vessels and found peculiarly well adapted for giving motion to the screw propeller. Its peculiarity consists in connecting the piston-rod to the piston by a joint, so that it works freely instead of being keyed on tight. A rectangular trunk or casing, bolted on the piston, encloses the rod and passes steam-tight through the cylinder cover, so that the upper end of the piston-rod, being attached to the crank-pin, is able to sway to-and-fro within its casing, whilst it impels the crank.

The Gorgon Engine is another form, absurdly deriving its name from the vessel in which this form of engine was first used. For several years it was highly esteemed, but is now receding in favor, and with reason, for the other direct-action engines already described are far superior. Its main characteristic is in attaching the piston-rod to the crank overhead by a short connecting-rod, which entails the evil of a short stroke and other disadvantages.

Two cylinders to each engine is another variety, in which case the two piston rods are connected by an arm (called a T-piece from its shape), and the connecting-rod is attached to the lower part of the T-piece, thus allowing it to be very long; this engine is, however, expensive and bulky. The long connecting-rod, which is so great a desideratum, is obtained by other makers in another way, who fashion the lower part in a forked-shaped so as to extend over a cross-head and side rods, to which latter it is attached. Before leaving this subject we think it right to mention that the employment of the double cylinder expansive engine, for steam vessels, has lately attracted considerable attention.

While discussing the economy of the marine engine, we shall make a few brief remarks on the rule adopted by some writers, for finding the capacity of the air-pump, which, according to them, should bear a fixed ratio to that of the cylinder, that ratio being usually as one to eight, this has been already mentioned, except that the word "capacity" must be substituted for "diameter." This ratio, it can be shown, is only an approximation for the quantity of water required for condensing varies, of course, according to the temperature of the exhaust steam. Another element to be taken into account, is the normal state of the injection water, for the temperature of the ocean differs greatly in various parts of the world. Again, if surface condensation is employed, the size of the air-pump can be very much reduced, as its sole office is that of removing the condensed steam and the uncondensed vapor, but not the injection water.

(To be Continued.)

Anastatic Printing, &c.

MESSRS. EDITORS.—On page 59, No. 8, this Vol., Scientific American, there is an account of Randolph Appel's process of producing copies of printed books, &c. The said process has been known to me for at least twenty years, and during that time I have made many experiments upon various kinds of substances, such as leather, horn, ivory, brass, copper, iron, zinc, silver, &c., I also claim part of the honor for reproducing printed matter without the re-setting of type, making new engravings, &c. I am in possession of a large number of impressions on paper taken from printed books, papers, engravings, &c., which were taken directly from the paper surface without transferring them to metal surfaces; any amount of impressions may be taken in this way without injury to the original.

The following is a description of a process by which any desirable impression may be etched upon common *tin plate*:—Take a piece of tin plate (or tinned iron) which is new, clean, and free from spots and marks, cut it somewhat larger than the original subject from which it is desirable to make the etching or engraving, next take hold of the plate by one corner with a pair of pliers, and subject it to the heat of a spirit lamp, holding it in a horizontal position and continue the heat by moving the plate over the flame until the tin thereupon has thoroughly melted, when it must be withdrawn and held in the same position until the metal hardens again; it may now be cooled in water and polished with flour of emery or the like. All kinds of grease must be avoided; when thoroughly polished moisten the design with a solution of the nitrate of silver prepared in the following manner:—Take a half dollar (American coin) and dissolve it into an ounce and a half of strong nitric acid, diluted slightly with water to quicken the operation (the water should be hot), when the silver coin is found to be entirely dissolved place the contents into a half pint glass and fill up the remainder with pure cold water; the solution is now ready for use, and must be placed into a separate vessel in small quantities and applied with a soft brush to the paper; care must be taken never to immerse the brush into the larger portion of the liquid, for in case there should be more than one impression required or taken from the same design, the second would be apt to precipitate the silver in solution and it would require the hand of a practical chemist to restore it to its former condition.

When the paper of the design has been thoroughly moistened with the above solution, place it between folds of blotting paper to free it from all superfluous moisture, now place the plate in a press face upward, and the design upon it face downwards, and lay two or three folds of cotton, flannel, or woolen cloth upon the same, and then apply pressure by screw or otherwise, and then remove the paper quickly from the plate by taking hold of it by one corner. If the whole has been properly conducted, it will be found on examination that the plate has acquired a beautiful and uniform etching over the whole surface, and oftentimes it will require no further etching, but should it happen that the process is incomplete or unsuccessful, heat the plate and repeat the process as before, and if it is required to deepen the impression, heat the plate slightly, face upward, so as to harden the surface, then, when cold, moisten the surface by pouring pure water thereupon, holding it in a horizontal position so as to retain a quantity of the water, and next pour upon the surface nitric acid diluted in the proportion of one part of acid to eight of water. This being an extremely delicate operation, it requires to be conducted with the utmost care, or the whole design will be destroyed.

DAVID BALDWIN,

Godwinville, N. J.

[We have received a number of impressions—rather copies—of pictures, printed matter, &c., from our correspondent, the said copies having been taken without being transferred to metal. We have never seen any anastatic proofs which we considered equal to the originals.

For the Scientific American.
American Entomology.

While this branch of zoology is making wonderful progress in the hands of our transatlantic neighbors, there is no science, perhaps, in America, which meets with so many enemies who calumniate and try to degrade it, denying its utility, and representing it as a puerile and barren pursuit. There are some individuals who, if an immediate answer is not given to their query, *cui bono?* at once conclude it unanswerable. Such utilitarians consider what is beyond their own limited vision superfluous. The Creator has stamped everything good, and if this age would be called scientific, it must, like the mind of Bacon, in sweeping over the field of universal science, examine every rivulet as well as the imposing cataract.

The numerous family, coming in the province of entomology, comprise both foes and friends to man. They are capable of producing famine, pestilence, and disease. The productions of the earth, domestic animals, and even man himself are often a prey to this formidable enemy. The lion may destroy an individual, but the weavil may depopulate a city. Now to successfully oppose we must know the character of an enemy. Practically considered, therefore, it is for our interest to acquaint ourselves with this science. To some insects, on the other hand, we are under the weightiest obligations. To the bee we owe our most delicious sweet; to the silk-worm our most beautiful apparel; to the cochineal our richest dye. They consume animal and vegetable matter suffering decomposition; they are agents in the fructification of plants, whose organization and transformation offer an extensive field to the physiologist.—Vaccination is also indebted to entomology. Aside from usefulnes, it has beauty and elevation. No part of creation exhibits so much perfection in so small a space. Their variety of action and consummate adaptation of parts, bespeak the wisdom and power of Deity; to the ant and the bee we turn for examples of industry and economy, of harmony and order. Comparatively little is known of the insects of the United States, although we have motions to actuate us beyond those of any other nation, and it is the duty of scientific journals to display its advantages and diffuse a more liberal knowledge of these myriad beings which, of themselves, constitute a living world. A wide field for discovery is opened to the amateur of strong mind and persevering research.

J. O.

Gun Explosion at Gibraltar.

The Gibraltar Chronicle of the 22nd Oct. gives an account of a gun explosion while a portion of the garrison were carrying on gun practice with red hot shot. A 32 pounder, 9 feet 6 inches long, and weighing 56 cwt., charged with 10 lbs. of powder, a dry wad and a wet one, and 32 lbs. iron hot shot, having mis-fired, was reprimed and fired by percussion-hammer and tube. On the charge being ignited, the gun burst, scattering the carriage to atoms, the splinters of which knocked down six of the unfortunate gun detachment on the spot, wounding two of them.

The metal parted into a dozen pieces; four immense masses of several hundred weight each, were hurled nearly a hundred feet into the air and carried to a distance of nearly 300 yards from the platform on which the gun was standing; and the breech thrown to the rear, across the battery and public road, killed an ass on which a little boy—who miraculously escaped unhurt—was mounted. The whole battery was for an instant enveloped in smoke, and the panic which ensued during its clearing away was one of such intense anxiety as to baffle description. When we consider what a vast number of the military were at the guns, and the concourse of spectators, among whom were some Moors of distinction, it is passing wonderful that so few were hurt; and, above all, that only two cases may be deemed dangerous.

A New Metal.

Dr. Owen, of England, has discovered a new metal, of the earthy class, holding an intermediate position between magnesia and manganese; the name given to it is "Thalium." Its oxide, dissolved in hydrochloric acid is of a beautiful pea-green color.

NEW INVENTIONS.

Shingle Machine.

Measures to secure a patent for an improved Shingle Machine have been taken by Samuel Bell, of South Hanover, Indiana. There are several improvements in this machine, which is intended to cut shingles to a shape superior to those generally used. The form of the shingle is one of the specified improvements, and its merit consists in making the shingle of an equal thickness for one-third of its length, the remaining two-thirds being tapered, as to its thickness, to a point, which is effected by shaving down the under-side, or that side of the shingle which is not exposed to the weather. A sliding frame carries the splitting knife and also the first shaving knife, up to the block of wood which is to be formed into shingles. The shape of the splitting knife is peculiar, the cutting edge being concave, so that the edges of the shingle are split before the middle part, a plan which requires less power and works better. The beforementioned sliding frame or carriage is worked by means of a double crank, which also serves to impel an apparatus for clearing away the shavings from the first shaving knife and works a vibrating ram that moves the shingle forward to undergo the finishing process, which is accomplished by using two rollers, one of which performs the three offices of pressing, feeding, and cleaving; the other roller is shaped in a peculiar manner, being made concentric for one-third of its diameter, and the remaining two-thirds increasing in size in the form of an involute curve; in fact it has an eccentric motion, so that the shingle, being forced along between this roller and the finishing knife, is formed to the shape described. Two other rollers then remove and deliver the finished shingle. The inventor mentions other ingenious substitutes for the eccentric roller just described, and has many excellent arrangements for the various requirements of the machine.

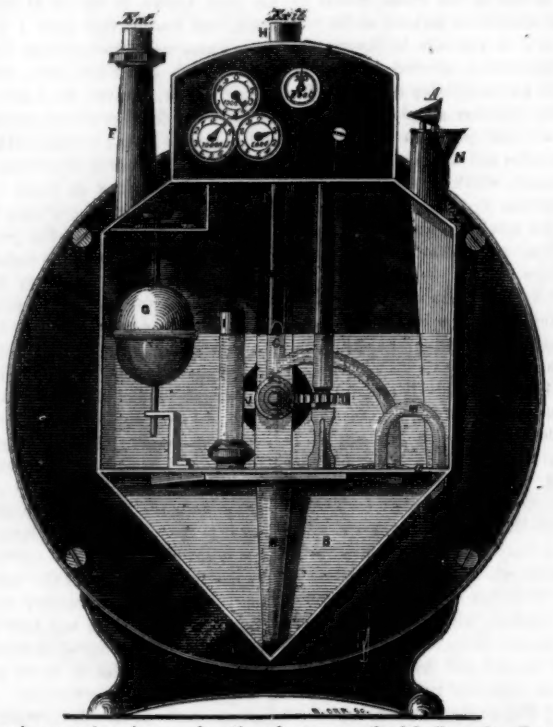
Pipe Moulding.

An improved method of casting any kind of pipe, lamp-posts, &c., has been invented by George Peacock, of West Troy, N. Y., who has taken measures to secure a patent. The process consists in the employment of a lozenge-shaped iron bar, with projections of a suitable form, on the lower side, to bind the sand for the core, and of a core box of the size and form of the pipe intended to be cast. The core is then adjusted in the mould (the collars at the end of the core bar resting on the end of the flask), and is anchored or prevented from rising by means of metal strips or bridges, which fit in recesses cut in the upper part of the core bar, and rest upon wooden supports. When the liquid metal is poured into the mould, these latter burn out, and the strip or bridge falls into the recess, and the anchor and core may be withdrawn. The upper part of the core bar, that is, the triangular part, is not quite as high or as deep as the lower, to which the wings are attached. This is for the purpose of allowing the core to be easily withdrawn from the pipe after it is cast. By the above process, pipes of any length may be cast, a desideratum that cannot be obtained by the method now in use. Another advantage of this new method is its application for making elbow or branch pipes, for this purpose the core-bar of the branch pipe is formed of two parts, with one end of each part fitting at opposite sides of the core bar of the main pipe. The two parts of the branch pipe have each a projection, which fits into a corresponding recess formed in the core bar of the main pipe. These projections being secured by wooden wedges within the above recesses, hold the two core-bars in position. The fluid metal, on being poured in, burns away the wedges, and the core-bars become detached from each other, and can be readily withdrawn.

Improved Kettle.

Thomas H. Dodge, of Nashua, N. H., has taken measures to secure a patent for an improved kettle. The improvement alluded to consists in the employment of a slide, for the purpose of keeping the handle immovable when required. This is effected by making the above-mentioned slide to fit in one of the tongues that connect the handle with the kettle, this tongue being grooved in such a manner that the slide, which is dovetailed, fits into the groove and keeps the handle in a fixed vertical position. To allow of the handle being loose, the slide can be moved into either of two different positions, as desired. A set screw may likewise be attached to the slide for screwing it fast to the handle when loose, but this is not essential to the operation. The advantages of this contrivance are to prevent the swinging to and fro of the handle of the kettle, and yet, when required, to allow of its being loose by moving the slide from its fixed position, as already described.

LAIDLAW'S PATENT PROTECTOR GAS METER.



The annexed engraving is an elevation with the front plate removed, of a gas meter invented by J. Laidlaw, of this city, and for which a patent was granted on the 2nd of last month, (Nov.)

A is the cap of the pipe, N, through which the water is poured into the chamber. There is a valve under the said cap which is pushed down to allow the water to be poured in. When the water arises to its proper determined level, it will flow down the opening exhibited in pipe, C, from whence it runs by a curved pipe into a small chamber connected with pipe, K, through which it flows to the chamber, B. The opening at, C, prevents the water rising above a proper level. When the water has filled the chamber, B, it rises up through a syphon, M, the inner end of which is inserted through the plate, *a*, into chamber, B, and its outer end is on the outside. It therefore carries off all the surplus water, and all impurities that gather on the surface of it. The gas comes in by the pipe, F, into a small chamber, then through a valve opening, regulated by float, G, in the usual way. It then passes down pipe, I, and out of it by pipe, J, into the dark central opening which is the centre of the common revolving drum, which is a nicely balanced centrifugal re-action wheel, and which is rotated by the gas passing in at the centre and out at the periphery; the axis of this drum moves the gearing to operate the dials to indicate how much gas has passed through the drum and out of pipe, H. The syphon, M, makes it perfectly self-acting, which is not the case with common meters. The water level being taken from the exact centre, tilting the meter on either side merely alters the position of the water without diminishing the quantity; and, if tilted forward, closes the pipes, I and J, thus stopping all communication of the gas into the drum, and if tilted backward, it displaces the water from the front of the meter, the float, G, falls, closing the valve at the top, thus shutting off the flow of gas.

The necessity of having artificial light is so universally felt, and each successive setting sun so effectually confirms that necessity that few subjects comparatively agitate the public mind more than this, embracing a discussion of the properties of the various articles used for producing it; their safety, economy, the brilliancy of the light obtained, &c., and while it is conceded on all hands that oil is often of a very inferior quality, and if carelessly used, often producing injury and filth, and the various compounds or admixtures known as etherial oil, resin oil, gas or fluid, are attended with more or less danger, and from their volatile nature are rapidly consumed, and hence really expensive, leaving coal or rosin gas after all, as probably the safest, neatest, most brilliant and equally economical. But even the use of these last named gases has caused no little controversey between the gas companies or producers, and the public or consumers, the latter alleging over-charging or false accounts of the quantities of gas consumed, owing either to the imperfection in the construction of the meter for measuring, or inattention in not promptly removing the water beyond the proper quantity, gathered there from condensation in the pipes, ill-construction of the meter or otherwise, and hence making the consumer chargeable for more gas than has been used; while on the other hand gas companies allege that they are often defrauded by dishonest consumers tilting their meters or otherwise diminishing the required quantity of water, and thus consuming large quantities of unregistered gas to the detriment of the producers, and these disputations between producers and consumers have raged to a greater or less degree ever since, the somewhat or more general introduction or use of coal gas in Europe, now only about a half century since, and it is a matter of some congratulation at least that a termination of these disputations may now be hoped for, and entire satisfaction given and received, as the patentee believes by the introduction and use of his Patent Protector Gas Meter exhibited at the late fair by Mr. John Laidlaw, from his gas apparatus manufactory in West Twenty-fourth street, this city, which meter embracing such combinations, among others, as by a self-acting, ever-ready, syphon, vacates any undue quantity of water from the meter, no matter how or where put in, and effectually securing to the consumer a registry of the exact quantity of gas he has used, and that only; and on the other hand effectually protecting gas companies from being defrauded by dishonest consumers tilting their meters, as the moment, they attempt this, the flow of water to an improper part of the meter will close the valve and shut off the supply of gas which a consumer seeks unrighteously to obtain—nor can the companies be defrauded by reducing the water by either suction or screws below the proper level, nor by the water being blown out by the pressure of the gas as is done in all these three ways in the meters commonly used, nor can companies be defrauded as in other meters by removing the dry wall screw, and attaching a pipe so that gas can be used without registering, and without the knowledge of the company, as this improved meter dispenses with screws entirely, the opening of which and consequent escapement of gas has so often caused serious accidents producing fires, explosions, and loss of life.

INDEX CIRCLES.—The figures on the first circle to the right express hundreds, on the second thousands, and on the third tens of thousands, and should there be a fourth circle, hundreds of thousands; or, each revolution of the right hand pointer indicates 1,000 feet of gas consumed, the next 10,000, and the third 100,000.

RULE FOR PLACING THE METER.—Let the meter be set perfectly level, and attach the company's service pipe to the union pipe marked ENT, at the top of column, F, and the pipe leading through the building to the exit pipe marked, H, as shown at the back of the index box.

RULE FOR FINDING THE CONSUMPTION OF GAS.—Put down two ciphers (00,) then mark down the figure least in value next the pointer on each circle, employed to obviate the inconvenience of taking into account a less quantity of gas than 100 cubic feet, no notice being taken of the small circle at the top of the dial.

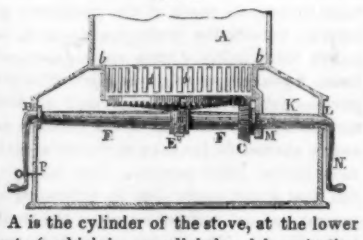
The above index will stand thus—49·200. Should a previous observation have been taken, it is necessary to subtract what the meter then indicated from 49·200, in order to know the quantity consumed in the interval.

Improvement in Rotary Stove Grates.

The annexed engravings are views of an improvement in Rotary Stove Grates, invented by Alexander Harrison, of the City of Philadelphia, and patented on the 5th of last October (1852).

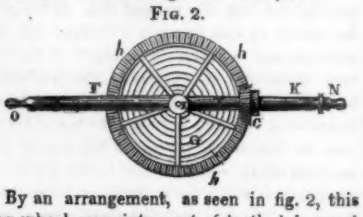
Figure 1 is a sectional view of a cylindrical stove, with the improved grating applied thereto; and fig. 2 is an under-side plan view looking upwards. The same letters refer to like parts.

FIG. 1



A is the cylinder of the stove, at the lower part of which is a small ledge, *b b*, projecting about three or four inches around the interior of the cylinder. At the inner edge of the ledge is fixed a series of small upright metal bars, *d d*, about two inches high, with spaces between for the admission of air. At the lower end of these bars is placed a flat circular grate, G, which forms the bottom of the stove, and is supported at its centre by a small vertical spindle or shaft, E. This latter rests in a socket formed in the horizontal cross shaft, F, one end of which rotates in a bearing, H, and the other in the mitre-geared wheel, C.

FIG. 2.



By an arrangement, as seen in fig. 2, this cog-wheel gears into a set of teeth, *h h*, round the under-side of the grate, G, so that, by turning the crank, N, motion is given to the shaft, K, and cog-wheel, C, the shaft, K, working in a bearing at L, and through a small vertical hanger at M; by which action the ashes are discharged from the grate. On the other side of the stove there is a similar crank, O belonging to the shaft, F, by turning which the spindle and grate are made to cant over and thus empty the latter of its contents. A pin is inserted at P to prevent the grate from turning over, which is withdrawn when it is required to tilt the grate.

The operation of this grate is so plain, that no further description is necessary; the invention is a good one. More information may be obtained by letter addressed to Mr. Harrison, at Philadelphia

Scientific American

NEW-YORK, DECEMBER 4, 1852.

Old and New Inventions.

We are conservatives in respect to inventions which are old and useful, and reformers in respect to those which are old and of an inferior character. Plain common sense teaches any man that it is foolishness itself to prefer an invention merely because it is new, and deride another merely because it is old. We are also advocates of all that is new and useful, but it requires experience, a great amount of knowledge, and disinterested judgment to tell what is new and useful; whether it has been employed before and superseded by something better. or had been before proposed, experimented with and failed, or has inherent defects. It frequently happens that old and exploded inventions are revived and presented to the public with the most glowing eulogies of their superiority and incomparable qualities; and it no less frequently happens that others possessing inherent defects are as prominently paraded and more vauntingly advocated. It is our duty—and we have often to perform it—to expose the worthlessness of the one class and the errors of the other. This we do without any reference to private and invidious prejudices—for we have none of them—but as public journalists speaking the truth as we believe it. We believe that much wrong is prevented from being perpetrated on the public by timely exposures ot unworthy objects, many of which it has fallen to our lot to hold up, either to scorn (according to the manner in which they were heralded) or to a candid and kind criticism. Almost daily, we have either old or inferior inventions presented to us for our opinion, by honest and worthy inventors, many of whom are disappointed at discovering the age or inferiority of their plans, but generally all satisfied with our conclusions. Two years ago we were asked for our opinion about propelling a ferry boat across a river in South Carolina by the power of a huge *spring* wound up with a crank; we informed the inventor that the same device had been applied to a boat in this city in 1808, and that it had inherent defects. Nothing but a trial, however, would satisfy the inventor, and that did satisfy him to his cost, but he thanked us for our information. Three years ago a gentleman in Syracuse, N. Y., asked our opinion about a substitute for the crank which he had invented; we gave our opinion that there was no loss by the crank, and it was the most simple and best device ever invented to convert rectilinear into rotary motion.—The inventor concluded he would try his own device; the result of his experiments, however, confirmed every word we had said, and his testimony to this effect we published on page 99, Vol. 5. We could name a great many such cases, but we have not room to do so. Of the many public exposures which we have made, not *one*, we believe, has turned out different from what we predicted, although we are liable to make mistakes as well as others, for none are perfect, but we are disinterested.

In our last volume we gave our opinion respecting the worthlessness of a project which was presented to the public in this city for navigating plank and common roads with steam carriages. It would have been easy to have proven us incorrect if we were wrong, by the said company putting their plans in operation; and when we consider that this could have been done at no very great outlay, and that the company was composed of editors, lawyers, artists, &c., who make pretensions to science, and practical mechanics, it is certainly presumptive evidence that some of them have become convinced that we were right, if not, they have acted unwisely. It is now eighteen years since Robert Mills, engineer and architect in Washington, published a pamphlet recommending the adoption of steam carriages for common roads. At that time, (1834) railroads were almost unknown in our country; there was but a single short railroad then in this State, (N. Y.) Since then railroads have multiplied until they have laced our entire country with an iron network of 12,000 miles. To advocate steam carriages on common roads now, when we have railroads on which the resistance is twenty times less, betrays a great want of judgment.

With respect to new and superior modes of travelling; too much attention cannot be bestowed upon them. The steamboat and railroad are fast revolutionizing the world; but it is not to be supposed that we are yet at the end of such inventions and improvements. A means of safely, cheaply, and rapidly navigating the atmosphere may yet be invented, but no plan hitherto proposed or tried meets these positively necessary conditions; we confess, however, that we have far more confidence in balloons than steam carriages on common roads. An invention to be successful must not only be new, but useful—an improvement. Any plan or invention having these qualities, no matter by whom invented or proposed, we advocate with pleasure and hail with delight.

The Effect of Climate on Health—Consumption.

"Man is born to trouble as the sparks fly upward." It is well known that peculiar diseases belong to peculiar climates. Thus, for example, consumption is the most prevalent disease in Britain, the New England States of America and nearly the whole of New York State; the young and the lovely are its victims, and it leaves its impress on some families for generations. The tender plant grows up in loveliness and beauty, but just when the bud is ready to burst forth and bloom, there comes the chilling frost of consumption, and the expanding leaves and bud begin to droop and decay. It spares no rank, yea, rather those who are blessed above others, and more exempt from common troubles on account of their wealth, are more often the victims than the children of the poor. On this account, its general prevalence, and deceptive character, it has received more attention from medical men than any other disease. Its local causes have long been understood, but the remedies suggested are exceedingly numerous. Many patients linger so long and hope so much, that quackery with its brazen front has found an ample field for pandering to the hopes and credulity of the weak. In general, respectable physicians have counselled a change of climate, and invalids from the Northern States have generally gone to the Southern States, and the West Indies; those of England went to the South of France or Italy. Lately, some English physicians have come out against a change of climate, especially a mere change from a cold to a warm region, asserting that some warm regions are more dangerous to invalids than their own cold native hills and valleys. Dr. Burnett, of Boston, has written an able article on this subject to the Boston Medical and Surgical Journal, in which he attributes the prevalence of consumption in the New England States to the intemperate changeable climate, the tendency of which is to produce disease in the pulmonary organs. The only season of the year when the climate is favorable to lung diseases is during the month of September, and the first part of Oct., when the air is warm, dry, and quiet. It has been customary for Northern invalids who went South to return when benefitted. In general, all who did so have been re-attacked, and finally carried off (sometimes very suddenly). From statistics and information which Dr. Burnett has been collecting, he has come to the conclusion that consumptive invalids, to be permanently benefitted by a change of climate must go South and make their home there. They must also go there in the early stage of the disease, for when too weak they but leave home to die. The climate of Greenville, in South Carolina, and some parts of Georgia is exceedingly favorable to those laboring under this disease; in summer the temperature rarely exceeds 90°, and is free from sudden changes. Dr. Burnett is of the opinion that the American States possess a variety of climate and advantages for this disease, far superior to those of Europe, and as the people of England—those possessed of wealth are becoming dissatisfied with Italy and Madeira, it is not improbable that with the present rapid Atlantic steam communication, our country may soon become the home of many of the noblest and most wealthy of her inhabitants. If they are wise for themselves they will make at once for a new and a better home on the western continent.

Volcanoes, their Cause—Igneous Theory.

With our ideas of volcanoes we always associate the grand and the terrible; and a volcanic eruption—a huge piece of artillery, with a mouth perhaps miles in circumference, shooting up rocks and burning lava—is truly a terrific sight. Volcanoes are exceedingly plentiful on our planet, there being no less than sixty-three principal ones; still, they are confined to certain localities, which occupy but limited portions of our globe. The question has often been asked, "what is the cause of volcanoes?" And truly, when we consider how disastrous some of these eruptions have been, no wonder the question of their cause has been forced upon the attention of almost every reflecting mind. It is one well worthy of some speculation, and requires a considerable amount of scientific knowledge to investigate. and this may be usefully employed either in pointing out errors or presenting new facts. Various opinions have been expressed respecting their origin and activity. One thing is certain, they are in no way connected with solar influence, for they exist under the tropics of South America, and are found in the frosty regions of Iceland. It was the opinion of Darwin, that the volcanic districts of the world had earthy crusts resting on lakes of igneous melted matter. Humboldt believes that the volcanic region of Quito, in South America—the whole of that vast Plateau—is a single volcanic surface, composed of a solid crust covering a lake of molten matter. Such opinions, however, have nothing to do with a general theory, of which there are two—one is astronomical, and asserts that this earth was originally a fiery molten mass, and that we live on its crust, beneath which all is molten fiery matter; the other theory is chemical, and asserts that they are caused by explosive materials deposited in huge quantities in the volcanic localities, and which, when saturated by some means with oxygen, and ignited, act exactly like any explosion of artillery. Leibnitz first suggested that this earth was originally in a fiery fluid state; Sir Wm. Herschell afterwards suggested the hypothesis of matter being originally in a nebulous state, which, by condensation, developed great heat, and our earth became a fiery ball, the surface of which we now live upon being a mere crust, the rest not being cooled yet which, when reached by water, causes an explosion like a steam boiler. This is the nebular igneous theory.

The author of "The World Without" states how easy it is to account for volcanoes by this theory, by saying—"according to the fiery nebulous theory, the earth, at a depth of sixty-five miles, is 7000 degrees temperature, and if water percolates through fissures of the earth, we have a sufficient explanation of earthquakes and volcanoes."

This theory is unsound, and will not stand the test of scrutiny. The arguments adduced to prove that the interior of the earth is a fiery molten mass, is, the increase of temperature found to exist as we descend in some mines, which is about 1 degree for every 45 feet. According to this rate, at 25 miles depth, the melting point of iron would be obtained; but we have no facts to prove that the heat of the earth increases regularly to the centre; after a certain depth, it is perhaps uniform. What signify the experiments made in a few mines not over 2,000 feet, deep. From observations made by Kotzebue, Beechy, and Sir James Ross, the fact seems to be established that the waters of the ocean (it is also matter) are uniform in heat, at the depth of 7,200 feet. At the depth of 100 fathoms, as stated in Maury's Wind and Current Charts, the temperature of the water in "the cruise of the Taney," was 64°, while at 50 fathoms, one half, it was 70°. In the soundings by the sloop-of-war Albany, at 680 fathams, the temperature was 81°, while that of the air was 83°, and at 995 (5970 feet) fathoms it was only 80°, while the temperature of the air was 79°. Now if it were true that the heat increased downwards, at the rate of one degree for every 45 feet, as asserted by some, then with a temperature of air at 79°, the water of the sea at 5985 feet of depth, should be at the boiling point—212°. Instead of this it was only 80° at 5970 feet, only 15 feet less. How does this accord with a uniform increase of heat as one descends into the matter composing the earth?

Dr. Daubeny, and Sir Charles Lyell are advocates of the chemical theory, and the latter is a decided opponent of the central theory of heat. It is well known that when potassium is dropped upon water, it causes an explosion; if, in certain places of the earth, there were large deposits of this metal, and water percolate to or come in contact with it, a terrific explosion would ensue. It appears to us that volcanoes are local, and generally preceded by earthquakes. If the centre of the earth were fluid, according to the well-known laws of fluids those earthquakes, caused by volcanoes would affect equally every part of the earth's surface, a thing which we know they do not.

Our attention was directed to this subject by reading some accounts of the recent eruption of Mount Etna. There is no positive certainty respecting the real cause of volcanoes; but the general, yea, almost universal opinion expressed by writers on the subject, is that water in some way is an active agent in all eruptions. Water, however, in all likelihood, exerts no agency whatever; and a strong argument in proof of this, is, that in the moon there is neither atmosphere nor water, and yet the volcanoes of the earth are mere dwarfs compared with those on our satellite. Our views, then. are distinctly opposed to the prevailing igneous theory, and we choose, rather, to plead ignorance of the causes of volcanoes than adopt any theory which cannot stand the test of scientific analysis.

Dinner to Inventors in England.

On the 3rd of last month, (Nov.) one hundred and fifty gentlemen interested in patents sat down to a sumptuous dinner in Birmingham, to celebrate the British Patent Law Amendment Act. Muntz, the inventor of the metal which bears his name was there, so was Prosser, another eminent inventor, and Hindmarch and Webster, the two able counsellors and authors of works on patents were among the number. Some fine speeches were made, and inventors were congratulated on the boon they had obtained. Mr. Prosser said he was not yet satisfied, he looked forward to the time when patents would be obtained for half a crown, and specifications for one penny, (he forgot that the copyist needs pay as well as the inventor). Mr. Hindmarch spoke sensibly; he advocated the enrollment of the complete specification on receiving the patent. Mr. Webster contended that a mere outline description of an invention was enough when the patent was granted, always allowing six months for enrollment. He considered that with a few modifications the patent law was a good one, and he hoped, for the sake of inventors, that it would be long before Mr. Prosser's hopes were realized. He considered that low fees would make patents less valuable in England; this statement was allowed to be true, and met with a general response. He made a fierce onslaught on the opposition which was manifested against the bill by some members in the House of Commons, and completely demolished the trashy arguments (like those advanced in the New York Daily Times,) against patents. "The foolish idea," he said, "had got into the head of some men that *patents were bad things*, this was an idea which should be got rid of by every man who entertained it."

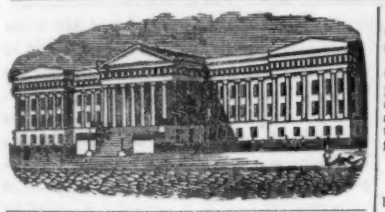
A Large and Small Wheel.

MESSRS. EDITORS.—In No. 10, Scientific American, you expect some of your friends in Muncy to prove how much the small wheel slides that is secured on the axle with two wheels of double diameter, (6 feet.) I will answer; it will slide exactly the whole of its circumference, and roll the whole of its circumference, which is $3{\cdot}14159 \times 3 = 9{\cdot}42477 \times 2 = 18{\cdot}84954$. We measure the distance which the large wheels travel by the point of tread upon the rail, which is a perpendicular line drawn through the axis, consequently the axis is drawn through a space of 18·84954 feet in one revolution of the large wheels, therefore, as the small wheel makes only one revolution, and its axis passes through an amount of space double its circumference, it follows, that it must slide 9·42477 feet.

The error which you also wish pointed out is the use of the word will *not* slide; it was superfluous. Am I right? R. M. B.

Muncy, Pa., Nov. 24th, 1852.

[R. M. B. is right; the communications received on this subject have been "*legion*."]



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office.

FOR THE WEEK ENDING NOVEMBER 23, 1852

SWINGING CHURNS—By Wm. F. & Nathan Davis, of Castleton, Vt.: We claim the combination of the swing slotted board wheel, rock shaft, and lever, for the purpose of producing two complete motions of the dash, from one full oscillation of the pendulum bars, substantially as described, to be denominated the "Oscillating Double-Acting Dash Churn."

PINCERS FOR OPERATING PILE WIRES—By Augustus Faulkner, of Walpole, N. H.: I claim the manner described of constructing and operating the claw, for withdrawing, carrying, replacing, and releasing the figuring wires, viz., by making one of the jaws fixed, and providing it with a pin or projection extending into a suitable slot in the sliding part of the claw, so that as said part moves back and forth, in contact with the fixed part of the jaw, the pin or projection therein will, when the figuring wire is to be seized, keep it in position for being properly caught in the claw, and when it is to be released, will prevent it from moving with the sliding jaw, as set forth.

SPACES FOR SETTING TYPE—E. C. Harmon, of Troy, Ohio: I claim the cyma recta, or other more su table shaped elastic space, for facilitating the art of setting type, or for saving the time and labor usually expended in "spacing out," "thin spacing," regulating the distance of words in the same line from one another, and "correcting proof," in the manner set forth.

FASTENING PALINGS TO RAILS IN IRON FENCES.—By Geo. Hess, of Easton, Pa.: I claim the circular projection, or its equivalent, on the rail and lower part of the paling, in combination with a corresponding cavity on the lower rail, so arranged that by giving a partial rotation to said rail the palings will be c amped to the rails, in the manner described.

DRYING PAINTS—By Heman S. Lucas, of Chester, Mass: I claim the process of treating magnesian mineral, such as serpentine silicates of magnesia and iron, and similar rocks, by mineral acids, to prepare from the sedimentary or insoluble, or undecomposed portions of such rocks or mineral product, which I call a basis, to be used in the preparation of pigments, as set forth.

HARVESTERS—By John H. Manny, of Waddams' Grove, Ill.: I claim, first, the arrangement of the track scraper and driving wheel, in such a manner that the latter, while the machine is cutting one swath, will run in the track cleared by the former, when the machine was cutting the previous swath, as set forth.

Second, the projections on the under side of the upper bars of the finger, in combination with the chamfer or recess on the lower inside corners of said bars, to counteract the tendency of wire grass and other fibrous obstructions to pass in between the cutter bar, and the sides of the recess in the upper part of the finger in which it is guided.

Third, forming the guard fingers of two parts, interlocked at the point, substantially as set forth, so that the grass cannot lodge in the joint and form an impediment to their entering between the stalks of the standing grain.

Fourth, in combination with a rocker stand or seat, a removable platform, constructed with a wing that extends from the outer end of the cutter, over the frame, and holds up the butts of the straws above the stubble, which otherwise would obstruct the discharge of the grain from the platform, substantially as set forth.

PRINTING PRESSES—By Chas. Montague, of Pittsfield, Mass.: I claim placing the bed-plate in a vertical position, when a reciprocating motion is imparted to it, by which the impressions can be made at each forward movement of the said bed-plate, as set forth.

I also claim the combination of the vertically acting bed, with a cylinder or cylinders, arranged in such a manner that the forward movement of the bed will impart motion to the cylinder or cylinders, to give or take an impression and allow said cylinder or cylinders, to remain stationary during the return movement of the bed, substantially as set forth.

BOOT TREES—By David Sadleir, of McWilliamstown, Pa.: I claim, first the arrangement and combination of the levers, friction rollers, screw, and slide, or their equivalents, with the back part of the tree, which, when constructed, all bed closely therein, for the purpose described.

PRINTING PRESSES—By A. H. Cragin, M. Buck, J. H. Buck and F. A. Tenney (assignors to A H. Cragin), of Lebanon, N.H.: We claim, first, the arrangement and combination of the movements, in connection with the bed, by which an extent of motion is imparted to the said bed, much larger than that of the sweep of the operating crank, whilst the whole of the said movements only occupy the space within the frame work of the press below the bed, the pinion shaft having pinions upon it, which gear into stationary racks, B B, made fast to the sides of the frame, and into racks, C C, secured to the underside of the bed, the forked lever, or its equivalent, having its forked extremities connected to the said pinion shaft, and its opposite end jointed to the lever that rises from the oscillating shaft, and the pitman connecting the said lever with the crank on the driving shaft, or the equivalents of the said movements, when combined and operating as set forth; disclaiming, however, the principle of imparting motion to a printing press, by direct application of power to the bed.

Second, the combination and arrangement of the pressure cylinder and the bed with the conveying bands, nippers, and cams for operating the said nippers, as set forth.

Third, the arrangement of the upper and lower tables with the pressure cylinder, bed, conveying bands, nippers, and cams for operating the nippers in such a manner that an impression can be made at each right and each left movement of the form under the cylinder, and the sheets be deposited after receiving their impressions upon the said lower tables, substantially as set forth.

WHIFFLETREES—By D. C. Williams, of Madison, Ohio: I claim a shaft with the ends bent at right angles, and the lever making part of the same, arranged and operating as set forth.

MACHINE FOR DRILLING STONE—By J. J. Couch, of Philadelphia, Pa: I claim making the drill rod to slide through the piston rod, as set forth.

I also claim the combination of the rocker lever, the wedge, the bolt within the lever, the two cam plates, the spring catch, the spring, and a projection, as applied to the drill shaft, the carriage or block, and the sideways thereof, and made to operate together, and to actuate the drill, substantially as set forth.

RE-ISSUE.

STEAM BOILERS—Cadwallader Evans, of Pittsburgh, Pa. Originally patented April 15, 1839: I claim the combination of a fusible alloy confined in a cup tube, or case, with a metallic stem, rod, or other fixture, not fusible at the melting temperature of the alloy, which stem, rod, or other fixture, is held or kept in position whilst the alloy remains hard; but when said alloy is fused, said stem, or its equivalent, can move or have motion, by which liberty to move any valve may be liberated, or caused to open and let steam escape, or any alarm may be let off, or any index moved, so that this combination may act as an alarm indicator, or safety apparatus.

Also, in combination with said alloy and plug, the heavy slotted weight, lever, or its equivalent, and safety or escape valve and its ordinary weight, acting in the manner and for the purpose described

Recent Foreign Inventions.

NEW COMPOSITION FOR RAILWAYS AND OTHER CONSTRUCTIVE PURPOSES.—Mr. Owen Williams, of Stratford, has patented a composition to be used in railways and other structures, in lieu of iron, wood, or stone, and for building purposes generally. One of these compositions consists of 180 lbs. pitch, 4½ gallons creosote, 18 lbs. resin, 15 lbs. sulphur, 45 lbs. finely powdered lime, 150 lbs. gypsum, and 27 cubic feet sand, breeze, scoria, bricks, stone or other hard materials, broken up and passed through a sieve with half-inch meshes. The sulphur is first melted with 30 lbs. of the pitch, after which the resin, and then the remainder of the pitch is added with the lime and gypsum, by degrees, and well stirred till the mixture boils. The earthy and stony materials are then added, and the creosote mixed in, when the composition is ready for moulding into blocks, to which pressure is applied. The claim is the mode of preparing such composition, particularly the use of sulphur therein.

PREPARING MADDER—C. A. Kurtz, chemist, of Manchester, Eng., patentee. The improvement is for treating madder roots and ground madder, or munjeet, for calico color-makers. The patentee takes 20 lbs., of crushed malt and boils it in 100 gallons of water for half an hour; he then stops the boiling and adds 45 lbs. of wheat bran, stirring the whole together, and then allows the liquor to settle. When settled the clear is run off, and to every 65 gallons of it 100 gallons of water are added, which is placed in a copper vessel and heated to 112° Fah., and to this is added 3 cwt., of madder or of munjeet ("Rubia Munjista"), which is stirred at intervals of 15 minutes, until a homogenous mass is produced. In this state the mass is allowed to stand until it exhibits symptoms of fermentation, when they are checked by successive stirrings for 18 hours. This prepared madder is then filtered, pressed, dried, and ground, and packed away for use like garancine.

TO PREVENT INCRUSTATIONS IN BOILERS—M. Libbald, patentee.—To prepare the compound, take one pound melted tallow, one pound of black lead, two ounces of powdered charcoal, and one gill of gas tar; these are well mixed together, and present the proportions of the scale preventative. This composition is applied while hot, with a brush, to the inside of the boiler. It also makes a good black paint for fences, outhouses, &c.

EXPLOSIVE COMPOUNDS—S. Davey, of Rouen, and A. L. Cance, of Paris, France, patentees.—The explosive compound is formed of 6 parts, by weight, of the chlorate of potash; 5 parts of nitrate of potash; 5 parts sulphuret of antimony; 2 parts yellow prussiate of potash, and 2 parts bichromate of potash. A second explosive compound or powder is formed of 6 parts chlorate of potash; 3 parts nitrate of potash; 3 parts sulphuret of antimony, and 4 parts of the prussiate of potash. Each of these ingredients is separately ground to a fine powder, and the whole of them, when so ground, are thoroughly mixed together, when the said two compounds are fit for use.

MACHINE FOR RESTORING HUMAN HAIR—R. Griffiths, England, patentee.—This is a new touch in the hair restorative art, and does not consist in any of your lotions, &c., but a real true-blue mechanical operation. It consists of a machine containing combs and brushes, so arranged and constructed as to produce a galvanic current when used. The teeth of the combs are made of copper and zinc, alternately, and continued back to a chamber in the hind part of the comb, in which is placed a flannel saturated with salt water as an excitant. The object of the invention is to excite an electric current when the combs or brushes are used. The brushes are made of fine copper and zinc in place of bristles.

Vinegar—Its Adulteration.

It is our opinion that adulterated liquors of every description are manufactured and sold in great quantities in our city. Out of a hogshead of whiskey, nine or ten different liquors are made and palmed off for the real Simon Pure. We believe it is the same with other liquids besides those containing alcohol. Vinegar, for example. Are we sure that all the vinegar sold in our city is genuine? No, we are not. The majority of people do not know how to judge of good acetic acid, they are perfectly satisfied if what they get for it is perfectly sour in taste and has the yellow color of the excellent old cider vinegar, that is made by our farmers. It is easy to make a cheap spurious article, and no doubt hundreds of people daily use a mixture of vitriol, water, &c., in the firm belief that it is real vinegar, because they have purchased a liquid of that name. The manufacture of spurious vinegar is an old story, we have heard an old soldier who fought on the frontiers during the last war, state, that the troops were often served with vitriol and water for vinegar while at Oswego, and their health was affected by it, until he discovered the imposition, and where it was manufactured—a few miles distant in the woods.

Where there is no cencorship exercised over the manufacture of such liquors or liquids, there is great room for evil doers to do acts of the greatest enormity—we consider that the adulteration of any article of food or drink is almost venial crime. In London there is an analytical sanitary commission of eminent chemists and doctors, appointed to analyze the articles which are daily used by the people and sold wholesale and retail. They report the names of those whose articles are adulterated, who are amenable to law, and those whose articles are pure. The late report of the committee states, with regard to vinegar and its adulterations, that out of 28 samples purchased at the houses of various retailers in different parts of the city, and the productions of almost every maker of any note by whom the entire metropolis and its suburbs are supplied, only four out of the above number were free from sulphuric acid or oil of vitriol; that twenty-four were adulterated with that powerful and corrosive mineral acid; that two contained it in a small quantity only; that in three it was present in considerable amount; that 12 contained it in very considerable amount; and that in seven it was present in immense quantity. The report then publishes, as usual, the names of the parties selling and the makers of the adulterated articles, together with the names of the makers (unfortunately only four) and venders of the pure article. The fact of the vinegars of these four makers being found to be entirely free from sulphuric acid or oil of vitriol is regarded as most important, inasmuch as it proves most convincingly that the use of that highly objectionable acid, even in small quantities, is not necessary to insure the preservation of vinegar, and shows that its addition is made rather for the purpose of increasing its apparent strength. The report concludes by publishing a letter from Mr. Fletcher, surgeon, of Bromsgrove, showing how families might manufacture for themselves, by a very simple process, sufficient vinegar for the table, or for the purpose of pickling, by using sugar, treacle, and water, and a fungus known as the vinegar plant, and thus make themselves independent of dishonest manufacturers.

Every American family knows how to make vinegar; it is therefore needless for us to tell how this can be done; but at the same time, we must say, that there are so many families in cities like New York, who have not the conveniences to make it, and it is so much easier to buy than to make it, that there should not be the least necessity for doing so, and there need not, if things were well managed. We should have an analytical sanitary commission in this city, to examine both solids and liquids, so as to have only pure articles sold, and those punished who sell adulterated articles. Now what would our Common Council say to the appointment of such a commission? We believe if such a commission was appointed, a great amount of good would be accomplished by it. Let our Aldermen think of it; the subject is a very important one.

A New Propeller for Steamers.

Professor A. Crestadoro has just secured under the new patent law, an interesting scheme for propelling vessels.

He considers the use of paddles or blades to be a mistake similar to that which so long prevailed in the application of locomotives on railroads, and which materially retarded the progress of that invention, when, taking for granted the inability of the plain circumference of the wheels to propel the carriage, much labor and skill had been wasted in the contrivance of levers, which acted on the road in a manner somewhat resembling the feet of the horses. Now, as the appprehended insufficiency of the adhesion of the plain circumference of the wheels with the road to propel the carriage has been proved a fallacy, so he considers the necessity of paddles or blades, of whatever description they may be, as altogether fallacious and that the best and cheapest method of improving the propeller is to use simply the plain circumference of cylindrical drums. It is a natural supposition that a plain round surface should have no tractic adhesion with the water; but on close examination it will be found that not only such is not the case, but what is even more surprising, the tractic adhesion of a plain cylindrical drum is far greater than that of a paddle-wheel of equal size.

Taking, for instance, the steam vessel Atlantic, whose paddle wheels are of 35 feet diameter, and length of paddles 12 feet 6 inches, supposing a moderate immersion of five feet paddles—one pair of drums of equal size at equal immersion would displace a pair of cubic segments of about 135,631 lbs. of water, or, what amounts to the same thing, a pressure of not less than sixty tons would act upon the drums as a tractic adhesion which is by far superior to that afforded by the best method of paddle wheels in the most favorable circumstances. Now, the cylindrical propeller has the substantial advantage that it can be, when reduced to a moderate diameter, applied as well as totally immersed, if it be, (as proposed by the patentee,) fitted into a semi-cylindrical case, with only such a clearance as is just sufficient to let the drum have a proper action, the other half drum or semi-cylindrical projection being out of the case for the propelling action.—[English paper.

[There is a decided mistake in the conclusions of Prof. Crestadoro. No mortal man but himself, we believe, ever would suppose that paddle wheels were invented because it was believed that broad sheathed wheels would slide on the surface; such an idea never was entertained, consequently no such mistake as that referred to was ever made in the case of steamboats. The two modes of propulsion are entirely different, the one is by traction, the other by the displacement of an incompressible fluid. Now, the action of a rigid body passing over another rigid body, is altogether different from what it would be if propelled throngh a fluid. We have also to state that drums have been tried as substitutes for paddles, but as might be expected, proved utterly incompetent. We cannnot see how a man of science permitted himself to be led away by such an idea as that set forth in the above extract.

Telegraph between Quebec and Detroit.

The process of laying down the submarine wire across the Bay of Quinte, for the trunk line of telegraph now in course of construction between Quebec and Detroit, was gone through last week. The submarine wire, which works admirably across the bay, was manufactured in London.

All plants have a season of rest; discover what season is peculiar to each, and choose that season for transplanting.

TO CORRESPONDENTS.

T.S.L., of O.—Your article is very well written, but as we have devoted already so much space to the same subject for the last two weeks, we shall be obliged to omit it.

M. C. R., of O.—If we understand your description of the lamp, it is a valuable improvement. You had better send us a sample, from which we shall be better able to judge of its patentability.

T. H., of Pa.—We do not advise any one to order the receipt of Mr. Morse. If we had carefully read the advertisement it would never have appeared in our columns. We suppose your plan for increasing adhesion of locomotive wheels might work, but it appears too complex to come into use.

M. B. E., of Wis.—We have entered your subscription for one year. If you wish our opinion in respect to an improved scraper, please to send us a sketch and description, as we cannot undertake to furnish all the different claims which have been granted.

C. W. B., of Ohio.—If you wish us to say any thing more about your invention than what we have already, we shall require of you an operating model.

S P. D., of N. S.—The most popular work on the steam engine is Dr. Lardner's; price, we believe, about $4. Messrs. Appleton & Co., 200 Broadway, sell it. We do not know of any models or plates for sale.

D. S., of N. J.—We believe you have a new idea, but whether it be practicable or not, is more than we can tell from your rude drawing. Send us a model and we will advise you further—guess there is no doubt but that your plan is patentable.

G. C., of N. Y.—We will admit that your pump is unlike Jeffrey's in some of the details, but we do not discover any patentable points about it.

L. C. L., of Ky.—We do not agree with your sentiment in that respect; we think a man's title to his Letters Patent should be protected by the same laws that protect to him his farm or his cattle, and why not let it be attachable for debt by the same process?

M. W. B., of Md.—The peculiarly mysterious performance which you explain as practiced among certain of your friends, must belong to the Spiritual Rapping department of science—a theory that has developed itself since we left school, therefore we are unable to enlighten your inquiring mind.

C. R. S., of Vt.—A letter addressed to the Commissioner of Patents, making the inquiry you do o, us, will be answered.

J. E. C., of R. I.—Your plan for a propeller has been submitted to us for an opinion as often as three times a year, on an average, for the last seven years—not a thing about it that is new.

J. A., of Me.—The work is for sale by H. C. Baird, Philadelphia, as the notice stated; the price we do not know.

J. B. C., of Boston—We either do not understand your invention, or else it is a miserable contrivance.

U. B. V., of Pa.—We have examined the sketch of your alleged improvement in brakes. Within the past year a patent was issued for a brake, which combined essentially the same principle as you illustrate.

J. N. F., of Va.—We will attend to answering your inquiries about boilers as soon as the information can be obtained.

J. B. A., of S. C.—Your specification and drawings have been forwarded to the Patent Office; it will be of no use to send the other model.

J. P. M., of Mass.—The use of speaking-pipes in any particular position, or for any specific purpose, would not be patentable. The plan your friend proposes has before been suggested to us. We addressed a letter to M. & D. on the 13th Nov., ult.

"Dumfries Reformer"—We think Messrs. Hoe can furnish you with the stereotype of a steam engine of about the size you mention; we cannot. $3 received on account of Mr. Stewart.

S. S. W., of Ga.—"Reid on Watch Making" costs $5,00 in this city, and the postage on it by mail would be about 75c. more.

J. L., of Pa.—You can find no one work which embraces all the information you require upon dyeing wool, silk, and cotton. We have seen a very small work, price $17, treating upon wool and cotton dyeing. Gilroy's work has several good processes in it, but where errors exist it requires a practical dyer or chemist to detect and avoid them. We do not know who has the work for sale, but think Messrs. Harpers & Bros. are the publishers.

J. C., of N. Y.—We can discover nothing new or patentable in your rotary engine; we have been familiar with its principle and construction for several years.

W. M., of S. C.— You will soon hear from us in regard to your invention.

J. P., of Ark.—Your alleged improvement in rotary engines will not interfere with Mr. Barrow's. Some two years ago an engine, upon the same plan, was put into operation in this city, but it did not prove to possess such advantages as were originally claimed for it.

Money received on account of Patent Office business for the week ending Saturday, Nov. 27:—

T. A., of N. Y., $30; S. E. S., of Vt., $30; G. P. of Conn., $55; H. G. R., of Pa., $55; F. F., of Me. $65; W. A. R., of Tenn., $10; F. H., of N. J., $30; J. B. T., of N. Y., $30; W. F., of Pa., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Nov. 27:

J. E. A., of Conn.; G. W. W., of N. Y.; N. P. G., of N. J., and F. R. C., of Mass.

A Chapter of Suggestions, &c.

BACK NUMBERS AND VOLUMES—In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:—Of Volumes 1, 2 and 3—none. Of Volume 4, about 20 Nos., price 50 cts. Of Volume 5, all but four numbers, price, in sheets, $1. Of Volume 6, all; price in sheets, $2; bound, $2.75. Of Vol. 7, all; price in sheets, $2; bound, $2,75. Of Vol. 8, all the back numbers, at the subscription price.

PRIZES—Our subscribers will please to consider the great inducement offered to clubs, and to keep in mind the valuable prizes offered for the four largest lists of mail subscribers.

PATENT CLAIMS—Persons desiring the claims of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office—stating the name of the patentee, and enclosing one dollar as fee for copying.

PATENT LAWS, AND GUIDE TO INVENTORS.—We publish, and have for sale, the Patent Laws of the United States. The pamphlet contains not only the laws but all information touching the rules and regulation of the Patent Office. Price 12 1-2 cts. per copy.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the present Volume. [It is important that all who reside out of the States should remember to send fifty cents additional to the published rates for each yearly subscriber; that amount we are obliged to pre-pay on postage.]

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure, but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

PATENTEES—Remember we are always willing to execute and publish engravings of your inventions, provided they are on interesting subjects, and have never appeared in any other publication. No engravings are inserted in our columns that have appeared in any other journal in this country, and we must be permitted to have the engraving executed to suit our own columns in size and style. Barely the expense of the engraving is charged by us, and the wood-cuts may be claimed by the inventor, and subsequently used to advantage in other journals.

SCIENTIFIC MUSEUM.

To Know Good Guano.

As this substance is beginning to be extensively used by our farmers, and as there are many indifferent kinds of it, and perhaps considerable adulteration practiced, it will no doubt be a benefit to farmers to be able to judge correctly of its quality.

Common guano is a mixture of ammoniacal salts and earthy phosphates, and is composed of the excresences of sea fowl, deposited on islands in the sea, in latitudes where no rains fall. It is brought to the United States and Europe from two different parts of the world, viz., Africa and Peru; the former kind contains a larger amount of phosphates but less ammonia than the latter, and is therefore inferior. Guano contains water, ammonia, ulmic, uric, and humic acids, which are classified as volatile and organic matter, separable at a low red heat; also alkaline salts, such as sulphate of soda, chloride of sodium, and alkaline phosphates which are separable by boiling water from the aforesaid ash; also earthy salts, consisting of the carbonates and phosphates separable by hydrochloric acid from the residue aforesaid; also sand which is insoluble.

To analyse guano:—1st, calcine 100 grains in a capsule at a low red heat, until all black particles are burnt away and a white ash is left. Good guano should lose about from 60 to 70 per cent, of volatile matter. 2nd, digest the above ash salts, filter them, then dry the residue and weigh it. Good guano should lose from 4 to 6 per cent. of these alkaline salts. (The phosphoric acid can be separated from this solution by adding sulphate of magnesia and ammonia, which precipitate it as ammoniac phosphate of magnesia.) 3rd, The residue of the above is then digested in hot hydrochloric acid, then filtered and well washed; then weighed, the loss is carbonate and phosphate of lime and magnesia, which are precipitated by ammonia, this, on being dried and submitted to heat should amount to 15 or 20 per cent. of the whole guano. 4th The residue is sand and should never exceed four or five per cent. in good guano.

One sign of good guano is, that from fifty to seventy per cent. should dissolve in a hot solution of caustic potash with a strong smell of ammonia; from thirty to forty-seven per cent. of good guano is soluble in water. It would be well if every planter and farmer had a small laboratory for experiments, always taking care to be as economical of time for out-door business as possible. We advise our young farmers to cultivate a taste for chemistry and experiment; it is a science founded altogether on experiment. We can tell why two and two makes four in mathematics, but we cannot tell why oxygen and hydrogen combine in certain definite proportions and no others, to form water; we know that it is so by experiment, and the fact is an important one. There are many facts yet to be discovered, and agricultural chemistry offers a wide field for investigation.

Motion of Water.

The smallest inclination capable of maintaining the mobility of water is 1-1000000, but it is barely perceptible at twice that inclination. At 1-9288, the mean velocity is six inches per second; at 1-2700, seven inches per second. The aqueducts of the ancients were inclined from 1-432 to 1-648. The minimum velocity necessary to maintain the salubrity of water is 13 3-4 English inches per second.

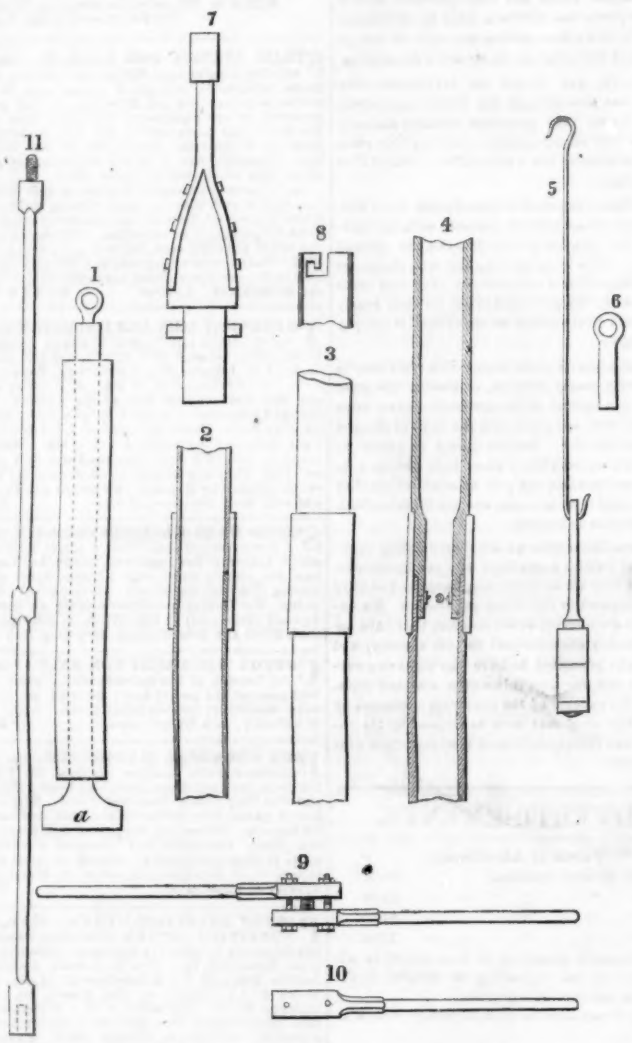
Iron Casks.

African Trade attracts much attention in English commercial circles at present. It is intended to establish one or more lines of steamers to ply between England and the African coast, to be engaged in the traffic in palm oil, etc. For this purpose it is proposed to use the newly invented iron casks as a substitute for wooden ones, by which means the necessity of having coopers with each steamer would be obviated. Iron casks will, it is said, be cheaper and more durable than wooden ones, besides being more portable as they may be taken apart and set up again by any person, and when not set up, will occupy but a small space.

Well Sinking---Artesian Wells.

(Continued from page 88)

Boring—In our last article on this subject we presented two illustrations of the geological character of a country, where the boring for water to overflow the rim of the well would be successful. We will now present an illustration of some of the tools employed. When the mouth of the spring is scooped out, it is built around with well cemented bricks to keep out surface water, or by employing iron cylinders, or any suitable method, such as a bored log of timber, as mentioned in our last article on the subject. The simplest method of boring is called the "Chinese System." All the rods ordinarily connected with the boring tool, are dispensed with; and the borer is suspended by a rope, which, when the tool is lifted vertically and let down, it imparts, by its torsion, a sufficient circular motion to it. In this engraving, *a*, in fig. 1, is a tool surrounded by an iron cylinder; the products of the excavation become collected in the circular space between the tool and the cylinder, by which means they may be brought up to the surface. With this simple machine—various tools being used for different strata—it may be asked why this plan is



not generally used? The fact is, it is liable to bore a crooked hole by the twisting action of the rope; therefore, the ordinary plan is to attach iron rods to the borer, which are in lengths from ten to twenty feet, and screw into one another; a circular motion is given to the tool by the workmen above, but the iron rods have all to be unscrewed, when the products of boring are drawn up. When an Artesian well is to be bored, a flooring is laid with the hole in the centre, and wooden trunks or iron pipes are fixed as guides for the tools. As the hole is bored, permanent pipe is inserted, which are either of wrought or cast iron; figs. 2, 3, and 4 show lengths of these pipes. The collars of the pipes are generally screwed together. Wrought-iron pipes are seldom riveted; they have their collars soldered on them. The solder is run in and melted in the pipes by suspending an iron heater, (figs. 5 and 6) down the pipe; the small heater is made of one, and the large one of two circular pieces of iron. The pipes are slung down the well by means of a wooden plug (fig. 7), which has a pin or key passing through it; this is inserted into the end of the pipe, which is cut reversely in fig. 8, and can easily be withdrawn. The boring rods are usually turned round by the leverage of two handles (figs. 9 and 10). Where the work is too heavy for manual power by these levers, horse or steam power may be employed. The rods for boring are shown connected in fig. 11. A circular and vertical percussive motion is given to the tool; various plans have been employed to give the tool an easy rotary motion along with a vertical motion, to act upon the rock. The spring spiral motion, shown on page 40, this volume of the Scientific American, the invention of J. Thomson, of Philadelphia, is no doubt the most simple yet introduced. Various plans for giving the borer its proper motion have been brought forward; there is one of Messrs. Wightman & Vaughan, illustrated on page 132, Vol. 3, Scientific American; one on page 153, same volume, by Foster & Bailey; and there is one on page 137, Vol. 5, with improved tools—a foreign invention and well worthy of attention. We do not present these machines again, but merely refer to them as positive information already published in our columns.

In putting down pipes, of course the judgment of the operators must decide, according to locality and the nature of the strata, how this can be done in the cheapest and best manner.

(To be continued.)

Guano.

A German Chemist named Von Breisach has invented a kind of artificial guano, which can be had at less cost, and is equal in quality to the natural. The government of Bavaria have determined to give Mr. Von Breisach every assistance in their power.

We have been assured by the brother of Mr. Von Breisach, who resides in New York City that it is a most valuable discovery, and that there is a prospect of its being introduced soon into our country.

Gold Half-Dollars.

A private mint in California is coining half-dollars, some of which have reached this country.

The Anodonta rubens, from Senegal, a molluscous, though purely aquatic animal, will survive eight months out of water, exposed six months to a burning sun.

LITERARY NOTICES.

Nystrom's Treatise on Screw Propellers This is a very handsome and good-sized volume on a very important subject to marine engineers and those who are interested in steam navigation. The author is experienced in the construction of screw propellers. He is a patentee of the Calculating Machine illustrated on page 284, last volume of the Scientific American, and which is introduced into this work, and explained in its application to plain and abstruse calculations of every description. Figures of steam engines and propellers are presented and explained, and there is also a treatise on bodies in motion in fluids. There is an exceedingly useful table to find the pitch of propellers. Loper & Nystrom's patented propeller engine is also illustrated. The matter contained in this treatise is exceedingly valuable; new ideas and plain practical thoughts are uttered with a clearness and brevity which should make it sought after with avidity by all those whose profession or business lead them to be posted up in such information. It is published by the most eminent publisher in America of such useful works, Henry C. Baird, Philadelphia. It is for sale by Stringer & Townsend, New York.

The Analytical Chemist's Assistant.—This is a new work by F. Woeber, and published by Henry C. Baird, Philadelphia: it is translated from the German by Oscar M. Lieber, and treats of both Qualitative and Quantitative Analysis; it treats of natural, artificial, and organic compounds. It is an exceedingly able chemical work; we have quite a number of such works, and we say that this one is a favorite. To the student of chemistry it is a most excellent assistant and instructor. We are much obliged to Mr. Baird for this work. It is for sale by Stringer & Townsend, this city.

Regal Rome.—The early history of Rome is shrouded in fable and obscurity, yet it cannot be doubted but it must have been a wonderful one, to have formed the customs which moulded a people to conquer the world. This work, by Prof. Newman, of London, gathers together and presents, in a clear light, the historical details of early Rome, unravelling much of the mysterious, and forms an instructive introduction to Roman History. It is a neat volume, and the public is indebted to the spirited publisher, Redfield, this city, for its publication.

Poor and Ignorant; Rich and Educated.—This is a neat pocket volume, published by Fowlers & Wells, this city, and comprises two Lectures by Horace Mann, on Intemperance, and its effects on the "poor and ignorant," and on the "rich and educated." Although a small volume, it is "large" in importance, sound and truthful in all its teachings, and bears the impress of great knowledge and originality.

Littell's Living Age—This weekly periodical, published by Littell & Co., Boston, is the best transcript of the "living literature" of the age. it contains the very cream of the great foreign Quarterlies.

Meyer's Universum—Numbers 9 and 10; each number contains four magnificent steel engravings, illustrating views in different parts of the world, and fully described by a well-written article. This is an elegant publication and is deserving an extensive patronage. H. J. Meyer, 164 William street, publisher. Price each number 25 cents.

"A Treatise on Clock and Watch Making, Theoretical and Practical," by Thomas Reid, Edinburgh: illustrated by 20 folding plates; in 10 parts at 50 cents each Blackie & Son, Fulton street, N. Y.